DOCKET NO.: 272235US0PCT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE THE APPLICATION OF:
Susumu YAMANOBE, et al.

: GROUP ART UNIT: 1795

SERIAL NO.: 10/535,671

: EXAMINER: VERDERAME, ANNA L.

FILED: MAY 19, 2005

FOR: COLORING MATTER ABSORBING NEAR-INFRARED RAY AND FILTER FOR CUTTING OFF NEAR-INFRARED RAY

**DECLARATION UNDER 37 C.F.R. §1.132**

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Now comes Susumu Yamanobe, who deposes and states that:

1. I am a graduate of Gunma University and received my degree in the year 2001.

2. I have been employed by Japan Carlit Co.,Ltd. for 7 years as a researcher in the field of electric material

3. The following experiments were carried out by me or under my direct supervision and control:

Objectives

Heat and moisture stability is compared between a diimonium salt using $CF_3COO^-$ anion as a counter anion as disclosed in US 3,770,793 and the diimonium salts using sulfone imide of the claimed invention as a counter anion.

272235US0PCT
Declaration Under 37 C.F.R. § 1.132

Methods

(1) Preparation of a diimonium salt using $CF_3COO^-$ as a counter anion and a filter for cutting off a near-infrared light using the same (Additional comparative example 1).

In accordance with the current specification of the above-identified application, a diimonium salt using $CF_3COO^-$ as a counter anion and a filter for cutting off the near-infrared light were prepared by the following method.

(i) Silver trifluoro acetate and N,N,N'N'-tetrakis(p-dibutylaminophenyl)-p-phenylene diamine were added to DMF, the mixture was reacted at 60°C for three hours and the obtained silver was separated by filtration.

Then, water was added to the filtrate and the resultant precipitate was separated by filtration and dried to obtain trifluoro acetate N,N,N',N'-tetrakis(p-dibutylaminophenyl)-p-phenylene diimonium.

(ii) Then, 2 parts of the diimonium salt were dissolved in a solution containing 25 parts of methyl ethyl ketone and 13 parts of toluene added to 6 parts of acryl lacquer resin (manufactured by Soken Chemical & Engineering Co., Ltd.). The solution was applied to a commercially available polymethacrylic resin film (thickness: 50 $\mu$m) using a bar coater of 200 $\mu$m cap size. Then, it was dried at a temperature of 100°C for three minutes to obtain a filter for cutting off a near-infrared light.

(2) Heat resistance test and moisture resistance test

The heat and moisture stability was evaluated for the obtained filter in accordance with the method described in Example 1 of the current specification. That is, a heat resistant test was conducted while maintaining the filter in an atmosphere of a temperature of 80°C, and the percentage of the molar adsorption coefficient after a predetermined period of time

was calculated using the initial molar absorption coefficient at a wavelength of 1000 nm as 100% to determine the residual ratio of a dye.

Further, a moisture resistance test was conducted while maintaining the filter in an atmosphere of 60°C and 95% RH, and the residual ratio of the dye was determined in the same manner as in the heat resistant test.

The obtained results are shown in the following Tables 2 and 3 in comparison with diimonium salts in Examples 1 to 7 of the current specification. Constitution of the diimonium salts used in the additional comparative example and Examples of the current specification are shown in the following Table 1.

Table 1

| | Cation | Anion |
|---|---|---|
| Additional comparative example 1 | R: butyl group | $CF_3COO^-$ |
| Example 1 | R: butyl group | $R^1$, $R^2$: trifluoromethyl group |
| Example 2 | R: butyl group | $R^1$, $R^2$: pentafluoroethyl group |
| Example 3 | R: benzyl group | $R^1$, $R^2$: trifluoromethyl group |
| Example 4 | R: phenetyl group | $R^1$, $R^2$: trifluoromethyl group |
| Example 5 | R: 4-fluorobenzyl group | $R^1$, $R^2$: trifluoromethyl group |
| Example 6 | R: phenetyl group | 1,3-disulfone hexafluoropropylene imide |
| Example 7 | R: butyl group | 1,3-disulfone hexafluoropropylene imide |

(Note) R, $R^1$, and $R^2$ in the table show the substituents in the formula (1) of the present specification.

Table 2: Result of durability test at 80°C

| | Period of time | Additional comparative example 1 | Example | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Dye residual ratio (%) | Initial | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 24 h | 17.8 | | | | | | | |
| | 120 h | | 96.5 | 95.8 | 98.7 | 99.2 | 98.7 | 99.1 | 98.8 |
| | 240 h | | 94.4 | 93.1 | 97.2 | 98.0 | 97.4 | 98.2 | 97.7 |
| 480 nm Transmissivity Rate (%) | Initial | 59.0 | 77.6 | 78.1 | 77.2 | 77.9 | 77.2 | 77.9 | 77.3 |
| | 24 h | 75.3 | | | | | | | |
| | 120 h | | 77.2 | 77.5 | 76.8 | 77.4 | 76.9 | 77.5 | 76.8 |
| | 240 h | | 77.3 | 76.1 | 75.8 | 76.6 | 76.0 | 76.7 | 75.7 |

(Note) When the dye residual ratio decreases to less than 60%, the transmissivity rate increases conversely.

Table 3: Result of durability test at 60°C, 95%RH

| | Period of time | Additional comparative example 1 | Example | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Dye residual ratio (%) | Initial | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 24 h | 26.5 | | | | | | | |
| | 120 h | | 95.9 | 94.8 | 98.6 | 99.0 | 98.5 | 98.7 | 98.4 |
| | 240 h | | 94.4 | 92.9 | 96.6 | 97.4 | 96.5 | 97.5 | 96.5 |
| 480 nm Transmissivity Rate (%) | Initial | 59.2 | 76.7 | 76.1 | 77.1 | 77.9 | 77.2 | 77.9 | 77.3 |
| | 24 h | 66.1 | | | | | | | |
| | 120 h | | 75.0 | 74.0 | 76.1 | 77.4 | 76.5 | 77.4 | 76.3 |
| | 240 h | | 74.5 | 72.9 | 74.0 | 76.2 | 74.8 | 76.5 | 74.1 |

(Note) When the dye residual ratio decreases to less than 60%, the transmissivity rate increases conversely.

Results

As shown in the tables, the diimonium salt using $CF_3COO^-$ as the counter anion (as disclosed in US 3,770,793) resulting in the residual ratio of the dye being decreased greatly at the lapse of 24 hours and the heat and moisture stability thereof being remarkably poor when compared with the diimonium salts of the claimed invention.

272235US0PCT
Declaration Under 37 C.F.R. § 1.132

4. I declare under penalty of perjury under the laws of the United States of America that the foregoing is believed to be true and correct. 28 U.S.C. Section 1746 (1).

Susumu Yamanobe
Signature Susumu Yamanobe

Nob. 19, 2008
Date November 19, 2008